



Attorney Docket No. P109-US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Patel, et al.

Art Unit: Not Yet Assigned

Serial No.: 10/627,303

Examiner: Not Yet Assigned

Filed: 7/24/03

For: **MICROMIRROR HAVING REDUCED SPACE BETWEEN HINGE AND MIRROR PLATE  
OF THE MICROMIRRORS**

**INFORMATION DISCLOSURE STATEMENT**  
**PURSUANT TO 37 CFR 1.97(b)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-145

Sir:

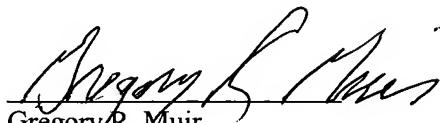
The attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached PTO Form 1449. Copies of the cited references are enclosed.

No fee or certification is required in connection with this Information Disclosure Statement, since it is being submitted prior to the last of (1) issuance of a first official action on the merits and (2) expiration of the three month period following filing of the above-captioned application.

The above information is presented so that the Patent and Trademark Office can determine any materiality thereof to the claimed invention. It is respectfully requested that the information be considered during the prosecution of this application and that the cited documents be listed on the front page of any patent issuing from this application.

The Patent Office is authorized to charge our Deposit Account No. 501516 for any fee which it deems to be required to effect consideration of this statement.

Respectfully submitted,



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PTO/SB/92 (08-03)

Approved for use through 07/31/2006. OMB 0561-0031

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This collection of information is required by 37 CFR 1.8. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.8 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Substitute for form 1449A/PTO				<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(use as many sheets as necessary)</i>				Application Number	10/627,303
Sheet	1	of	6	Filing Date	7/24/03
				First Named Inventor	Patel
				Art Unit	Not Yet Assigned
				Examiner Name	Not Yet Assigned
				Attorney Docket Number	P109-US

U.S. PATENT DOCUMENTS					
Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Document Number Number - Kind Code <sup>2</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 3,511,727	05-12-1970	Hays, R.G.	
		US- 4,190,488	02-26-1980	Winters, H.F.	
		US- 4,310,380	12-12-1982	Flamm et al.	
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		US- 6,051,503	04-18-2000	Bhardwai, J.K.	
		US- 6,436,229	08-20-2002	Tai et al.	
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		US- 6,290,864 B1	09-18-2001	Patel et al.	
		US- 6,355,181 B1	03-12-2002	McQuarrie, A.D.	
		US- 2001/0002663 A1	06-07-2001	Tai et al.	
		US- 5,439,553	08-08-1995	Grant et al.	
		US- 2002/0033229 A1	03-21-2002	Leboultz et al.	
		US- 2002/0196524 A1	12-26-2002	Huibers, et al.	
		US- 2003/0054588 A1	03-20-2003	Patel, et al.	
		US- 5,726,480	03-10-1998	Pister, K.S.	
		US- 2002/0185699	12-12-2002	Reid	
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		US- 5,835,256	11-10-1998	Huibers, A.	
		US- 2002/0047172 A1	04-25-2002	Reid	
		US- 2003/0166342 A1	09/04/03	Chinn, et al.	

FOREIGN PATENT DOCUMENTS					
Examiner Initials <sup>1</sup>	Cite No. <sup>1</sup>	Foreign Patent Document Country Code <sup>3</sup> - Number <sup>4</sup> - Kind Code <sup>5</sup> (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		EP-0704884-A2	04-03-1996	Mehta, J.	
		EP-0822582-A2	02-04-1998	Bhardwai, J.K.	
		EP-0822584-A2	04-04-1998	Bhardwai, J.K.	
		WO-99/49506	09-30-1999	McQuarrie, A.D.	
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		EP-0878824-A3	01-19-2000	McQuarrie et al.	
		JP-1982/57098679-A	06-18-1982	Tsunetoshi, A.	
		JP-1983/58130529-A	08-04-1983	Yoshihiro et al.	
		JP-1985/60057938-A	04-03-1985	Katsumi et al.	
		WO-98/32163	07-23-1998	Tai et al.	

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Sheet

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		US- 6,409,876 B1	06-25-2002	McQuarrie, et al.	
		US- 6,396,619 B1	05-28-2002	Huibers, et al.	
		US- 6,576,489 B2	06/10/03	Leung, et al.	
		US- 6,238,581	05-29-2001	Hawkins, et al.	
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		US- 2003/0077878 A1	04/24/03	Kumar, et al.	
		US- 6,197,610 B1	03/06/2001	Toda	
		US- 6,500,356 B2	12/31/02	Goto, et al.	
		US- 2003/0124848 A1	07/03/03	Chinn, et al.	
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		US-			

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		JP-1997/09251981-A	09-22-1997	Kazuaki et al.		
		JP-1998/10313128-A	11-24-1998	Hanmin et al.		
		JP-1998/10317169-A	12-02-1998	McQuarrie et al.		
		JP-1986/61187238-A	08-20-1986	Nobuo et al.		
		JP-1986/61270830-A	12-01-1986	Toru, T.		
		JP-1987/62071217-A	04-01-1987	Toru et al.		
		JP-1988/63155713-A	06-28-1988	Tadashi, F.		
		JP-1986/61053732-A	03-17-1986	Arata et al.		
		JP-1986/61134019-A	06-21-1986	Shinji et al.		
		JP-1986/61181131-A	08-13-1986	Shinji et al.		

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				<b>Filing Date</b>	7/24/03
				<b>First Named Inventor</b>	Patel
				<b>Art Unit</b>	Not Yet Assigned
				<b>Examiner Name</b>	Not Yet Assigned
Sheet	3	of	6	Attorney Docket Number	

#### **U.S. PATENT DOCUMENTS**

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Application Number	10/627,303
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First Named Inventor	Patel
Group Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	P109-US

### OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
		ALIEV et al., "Development of Si(100) Surface Roughness at the Initial Stage of Etching in F2 and XeF2 Gases Ellipsometric Study", Surface Science 442 (1999), pp. 206-214.	
		GLIDEMEISTER, J.M., "Xenon Difluoride Etching System" (Nov. 17, 1997).	
		HABUKA et al., "Dominant Overall Chemical Reaction in a Chlorine Trifluoride-Silicon-Nitrogen System at Atmospheric Pressure", Japan Journal of Applied Physics Vol. 38 (1999), pp. 6466-6469.	
		HECHT et al., "A Novel X-ray Photoelectron Spectroscopy Study of the Al/SiO <sub>2</sub> Interface", J. Appl. Phys. Vol. 57 (June 15, 1985), pp. 5256-5261.	
		HOULE, F.A., "Dynamics of SiF <sub>4</sub> Desorption During Etching of Silicon by XeF <sub>2</sub> ", IBM Almaden Research Center (April 15, 1987), pp. 1866-1872.	
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		IBBOTSON et al., "Comparison of XeF <sub>2</sub> and F-atom Reactions with Si and SiO <sub>2</sub> ", Applied Physics Letter, Vol. 44, 1129 (1984).	
		STRELLER et al., "Selectivity in Dry Etching of Si (100) and XeF <sub>2</sub> and VUV Light", Elsevier Science B.V., Applied Surface Science Vol. 106 (1996), pp. 341-346.	
		VUGTS et al., "Si/XeF <sub>2</sub> Etching: Temperature Dependence", J. Vac. Sci. Technol. A 14(5) (Sep/Oct 1996), pp. 2766-2774.	
		WINTERS, H.F., "Etch Products from the Reaction of XeF <sub>2</sub> with SiO <sub>2</sub> , SiO <sub>3</sub> , Si <sub>3</sub> N <sub>4</sub> , SiC, and Si in the Presence of Ion Bombardment", J. Vac. Sci. Technol. B 1(4) (Oct/Dec 1983), pp. 927-931.	

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Sheet

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**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

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		Kurt Williams, Etch Rates for Micromachining Processing-Part II, 2003 IEEE, Pgs 761-778, Journal of Microelectromechanical Systems, Vol. 12, No. 6, December 2003.	
		WINTERS et al., "The Etching of Silicon with XeF <sub>2</sub> Vapor", Appl. Phys. Letter, Vol. 34(1) (January 1, 1979), pp. 70-73.	
		XACTIX, Inc., Marketing Brochure (June 27, 1999).	
		"Xenon Difluoride Isotropic Etch System: Seeing is Believing", Surface Technology Systems Ltd. brochure, Newport, UK (date unknown).	
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		BASSOM et al., "Modeling and Optimizing XeF <sub>2</sub> -enhanced FIB Milling of Silicon", 25th International Symposium for Testing and Failure Analysis, Santa Clara, CA (Nov. 14 -18, 1999), pp. 255-261 (abstract only).	
		KOHLER et al., "Fabrication of Microlenses by Plasmaless Isotropic Etching Combined with Plastic Moulding", Sens. Actuators A, Phys. (Switzerland), Vol. A53, No. 1-3 (May 1996), pp. 361-363 (abstract only).	
		CHAN et al., "Gas Phase Pulse Etching of Silicon for MEMS with Xenon Difluoride", Engineering Solutions for the Next Millennium: 1999 IEEE Canadian Conference on Electrical and Computer Engineering, Edmonton, Alberta, Vol. 3 (May 9 - 12, 1999), pp. 1637-1642 (abstract only).	
		CHANG et al., "Gas-Phase Silicon Micromachining with Silicon Difluoride", Proceedings of the SPIE - The International Society for Optical Engineering, Vol. 2641 (1995), pp. 117-128 (abstract only).	

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